JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1998, **31,** 647–650 NUMBER 4 (WINTER 1998)

ASSESSMENT OF SELF-INJURIOUS BEHAVIOR MAINTAINED BY ACCESS TO SELF-RESTRAINT MATERIALS

TIMOTHY R. VOLLMER AND CHRISTINA M. VORNDRAN

UNIVERSITY OF PENNSYLVANIA SCHOOL OF MEDICINE AND CHILDREN'S SEASHORE HOUSE

This study replicates and extends prior research showing that access to self-restraint materials can reinforce self-injurious behavior (SIB). A functional analysis was conducted showing that SIB occurred at differentially high rates when access to restraint materials (a leather jacket) was made contingent on the behavior. In addition, an alone condition during the functional analysis showed that SIB did not occur in the absence of restraint materials. Finally, a treatment analysis showed that functional communication training was effective using an alternative reinforcer.

DESCRIPTORS: self-injurious behavior, self-restraint, functional analysis

Recent research using functional analysis assessment methods has shown that access to self-restraint materials can reinforce self-injury (Smith, Lerman, & Iwata, 1996). Few studies have evaluated the reinforcing effects of restraint materials, so there is a need for replication of the Smith et al. methodology. In this study, we evaluated access to restraint materials (a leather jacket) as reinforcement for self-injurious behavior (SIB). Subsequently, we reinforced an appropriate communicative response with access to a more appropriate indoor garment (a cardigan sweater). The purposes of this study were (a) to replicate the functional analysis findings of Smith et al. on the reinforcing relation between SIB and restraint and (b) to extend those findings by evaluating a preliminary approach to treatment based on the outcome of the functional analysis.

METHOD

Participant and Setting

Denise was a 29-year-old woman who had been diagnosed with severe mental retardation and who had been admitted to an inpatient unit for the assessment and treatment of SIB and aggression. She used no vocal language but communicated occasionally using about 10 to 20 signs that resembled American sign language. Aggression was treated independent of this study. Denise also had a history of apparent self-restraint, which had taken a variety of forms in the past, including wrapping herself in clothing and clutching objects tightly. At the time of this study, she attempted to wear a leather jacket throughout the day and put her hands inside the sleeve cuff or clutched the cuff tightly. If the jacket was present and access to the jacket was restricted or if her hands were removed from the cuff, high rates of self-injury and aggression commonly occurred. Sessions were conducted in a therapy room containing a couch, chairs, a table, and other materials as needed. With rare exceptions, sessions were conducted two to six times per day, 5 days per week.

Recording and Interobserver Agreement

Observers were seated behind a one-way window and used laptop computers to record target behaviors. *Self-injurious behavior* was scored as self-pinching. *Mands* were

Reprints may be obtained from Timothy R. Vollmer, who is now at the Department of Psychology, University of Florida, Gainesville, Florida 32611.

scored as a brushing motion with the fingers down the chest area. During 27% of the sessions, a second observer independently scored occurrences of target behaviors. Interobserver agreement was calculated using the methods described by Smith et al. (1996). Agreement averaged 100% for SIB and 100% for mands. Self-restraint was not scored as a dependent measure because the frequency fluctuated solely as a function of jacket availability. That is, with the exception of occasional brief instances, self-restraint (i.e., wearing the jacket, clutching the jacket, or placing her hands in the sleeves) occurred virtually whenever the jacket was made available.

Procedure

First, functional analyses were implemented in which test conditions (contingent restraint and escape) were compared to control conditions (Iwata, Duncan, Zarcone, Lerman, & Shore, 1994). For the purposes of this study, the test versus control comparison of interest was contingent restraint versus a leisure and an alone condition. In the contingent restraint condition, Denise's leather jacket was removed from her but was kept in view; contingent on SIB, she was given access to the jacket for 30 s. The purpose was to evaluate whether access to the jacket reinforced SIB. In the leisure condition, Denise had continuous access to her leather jacket and attention; no demands were placed on her. One purpose of the leisure condition was to evaluate SIB rates when Denise had continuous and noncontingent access to the jacket. In the alone condition, the therapist left the room with the jacket and there was no programmed consequence for SIB. The purpose of the alone condition was to evaluate whether SIB would persist without contingent access to the jacket and in the absence of hypothesized discriminative stimuli (therapist and jacket).

Following the functional analysis, a series of treatment conditions was conducted. First, functional communication training with the jacket as a reinforcer (FCT with jacket) involved extinction for SIB (i.e., SIB did not produce access to the jacket) and reinforcement of the mand (as described above) with 30-s access to the jacket (Carr & Durand, 1985). Second, in an unsuccessful attempt to replace the jacket with a more appropriate indoor garment, FCT was conducted with a shirt rather than the jacket as a reinforcer. Finally, during FCT with cardigan conditions, Denise was taught to request access to a cardigan sweater (which was deemed more appropriate for indoor wear) by displaying a mand and SIB was placed on extinction. For the purposes of this report, the FCT with cardigan condition was of primary interest because an alternative reinforcer was identified and communication was strengthened via reinforcement.

RESULTS AND DISCUSSION

Figure 1 shows the results of the functional analysis and treatment analysis. The functional analysis showed that rates of SIB were elevated in contingent restraint in comparison to leisure and alone conditions. Given that SIB rates were zero or near zero during alone and leisure sessions, it was concluded that access to the jacket reinforced SIB. Unexpectedly, SIB did not occur when the therapist removed the jacket from the room and commenced the alone sessions. One explanation for this is that the stimulus context of jacket plus therapist was discriminative for jacket availability contingent on SIB. The relevant establishing operation (i.e., deprivation of jacket) was in effect during both alone and contingent restraint, but apparently removing the jacket from the room effectively removed the discriminative stimulus and the reinforcement contingency. This effect is akin to assessment outcomes

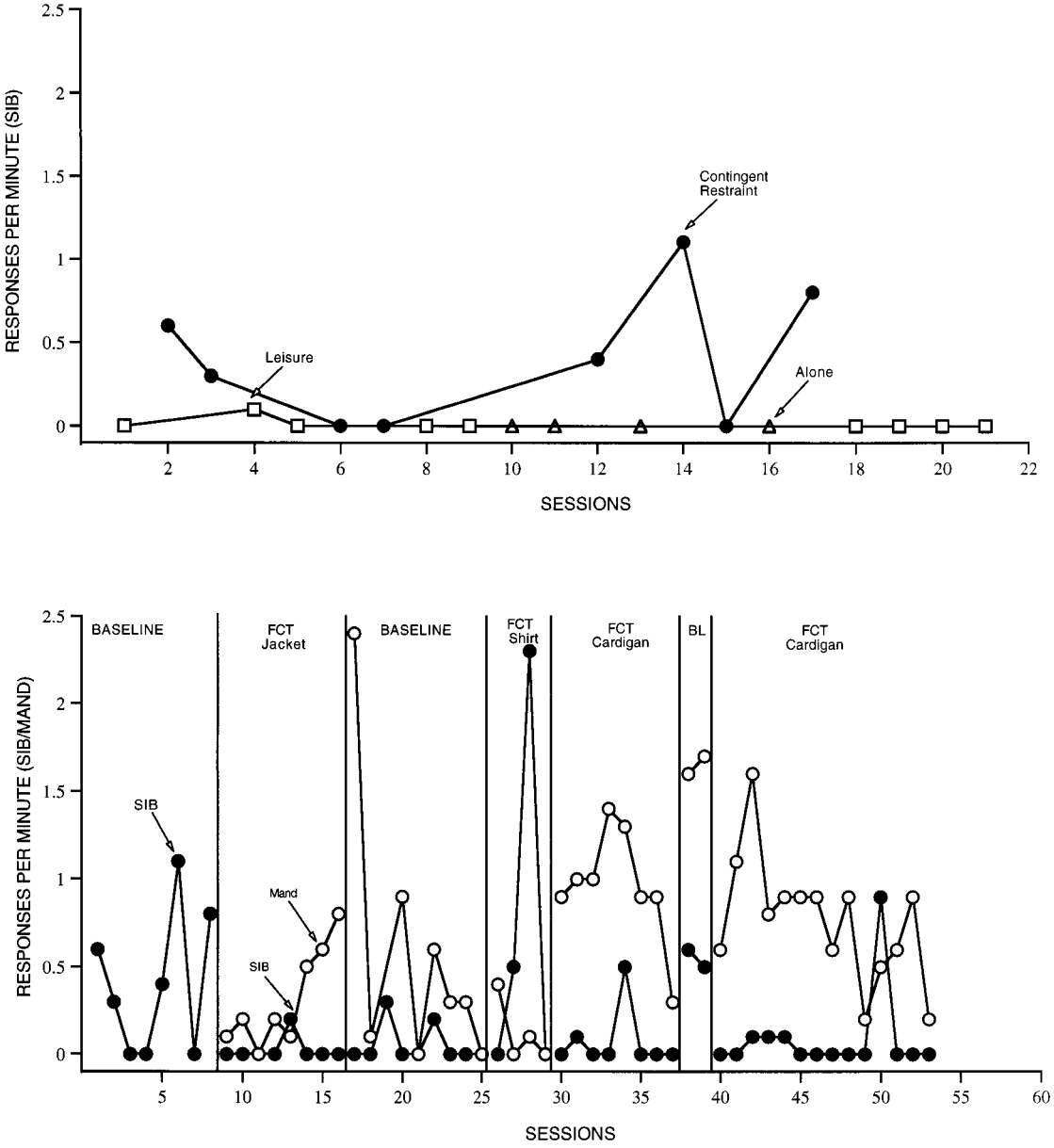

Figure 1. The functional analysis outcome (upper panel) and the FCT results (lower panel). FCT = functional communication training; SIB = self-injurious behavior; BL = baseline.

in which SIB never occurs during an alone condition but does occur during some other positive reinforcement test condition, such as attention or materials.

The results of FCT (see Figure 1) showed that (a) the mand occurred at relatively high rates during FCT with jacket, (b) SIB rates were low during FCT with jacket but did not return to baseline levels during a reversal to baseline, (c) SIB rates were high and mand rates were low during FCT with shirt, and (d) SIB rates were low and mand rates were high during FCT with cardigan. During a brief reversal to baseline between FCT with cardigan phases, the within-session response patterns (not depicted in Figure 1)

showed a burst of mands at the beginning of each session, followed by an apparent extinction curve. Instances of manding that were not reinforced were characteristically followed by instances of SIB. The bursting of mands resulted in high overall rates of mands during the reversal to baseline.

Overall, these results replicate and extend the findings of Smith et al. (1996). First, similar to the participant in that study, Denise's SIB was reinforced by access to restraint materials. Second, an alone condition augmented the analysis because it showed that SIB did not persist in the absence of contingent restraint. Smith et al. did not include an alone condition in their assessment. Third, a preliminary treatment analysis was conducted, which could lead to further research on the use of functional analysis outcomes to prescribe treatment for SIB maintained by access to restraint. Smith et al. did not report whether or how their assessment results led to treatment.

The treatment results in this study should be viewed with caution, however, because the jacket was not in the room during the FCT with cardigan condition. Because SIB rates were zero even in the alone condition of the functional analysis (another condition in which the jacket was not in the room), it is possible that Denise's SIB may have been treated merely by eliminating the jacket from her environment. Nonetheless, the type of treatment examined here could be useful in future applications for three reasons: (a) An appropriate alternative behavior was reinforced, (b) SIB was placed on extinction, and (c) a suitable replacement for an inappropriate indoor garment was identified. Future applications also might involve testing similar FCT procedures when SIB rates are not low in the alone condition of a functional analysis.

REFERENCES

Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis, 18,* 111–126.

Iwata, B. A., Duncan, B. A., Zarcone, J. R., Lerman, D. C., & Shore, B. A. (1994). A sequential, test-control methodology for conducting functional analyses of self-injurious behavior. *Behavior Modification, 18,* 289–306.

Smith, R. G., Lerman, D. C., & Iwata, B. A. (1996). Self-restraint as positive reinforcement for self-injurious behavior. *Journal of Applied Behavior Analysis, 29,* 99–102.

Received December 1, 1997
Initial editorial decision January 13, 1998
Final acceptance July 7, 1998
Action Editor, Cathleen C. Piazza